

In re Patent Application of
SERGIO ET AL.
Serial No. **09/994,384**
Filed: **NOVEMBER 26, 2001**

REMARKS

Applicants thank the Examiner for the careful and thorough examination of the present application, and for correctly withdrawing the previous rejections of the claims. Applicants submit that all claims are patentable, and present arguments herein supporting such patentability.

I. The Claimed Invention

Independent Claim 8 is directed to a method of reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors ordered in rows and columns functionally connected through row lines and through column lines substantially orthogonal to each other, using a biasing and reading circuit comprising column and row selectors, and a charge amplifier outputting a voltage of the pressure based capacitance of a selected pressure-sensing capacitor of the array. The method includes resetting an output voltage of the charge amplifier, and connecting nonselected row and column lines of the array to a reference voltage while connecting one of an auxiliary capacitor and the selected pressure-sensing capacitor to an input of the amplifier while connecting the other one of the auxiliary capacitor and the selected pressure-sensing capacitor to define a feedback capacitor of the amplifier. The method further includes applying a step voltage on the one of the auxiliary capacitor and the selected pressure-

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sensing capacitor that is connected to the input of the amplifier and reading the output voltage at steady-state.

Independent Claim 11 is directed to a related method of reading a capacitive pressure sensor. Independent Claim 15 is directed to a related system for reading a capacitive pressure sensor. Independent Claim 19 is directed to a related integrated circuit for reading a capacitive pressure sensor. Independent Claim 22 is directed to a combination capacitive pressure sensor device similar to Claim 19.

II. The Claims Are Patentable

The Examiner rejected independent Claims 8, 11, 15, 19, and 22 over Smisko in view of Zhang and further in view of Dickinson et al. As depicted in Figure 3 of Smisko, a photodiode read circuit is disclosed. The circuit comprises a plurality of photodiodes 108 coupled respectively to photodiode readout capacitors C1-N 114. Each photodiode is coupled to the charge amplifier circuit 85 by way of a transfer switch 116. The charge amplifier comprises an operational amp 123. The transfer switch is coupled to the inverting input 198 of the operational amp. The charge amplifier also includes a feedback capacitor 122 coupled between the output 197 of the operational amplifier and the inverting input with a reset switch 199 connected in parallel.

The Examiner correctly notes that Smisko fails to disclose an array of capacitors ordered in rows and columns

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functionally connected through row lines and through column lines substantially orthogonal to each other, and using a biasing and reading circuit comprising column and row selectors, as recited in independent Claim 8, for example. The Examiner looks to Zhang to supply this deficiency. Zhang discloses a CMOS imaging array including a rectangular matrix of pixels. (Col. 2, lines 30-37). The Examiner's stated motivation to combine the row-column arrangement and selectors from Zhang into the linear scanner of Smisko is to provide an image having a higher number of pixels compared to the linear scanner to generate an image of better quality.

The Examiner now correctly notes that Smisko and Zhang both fail to disclose pressure-sensing capacitors, as recited by independent Claim 8, for example. The Examiner looks to the newly cited Dickinson et al. reference for this deficiency. Dickinson et al. discloses an interface card for insertion into a laptop computer and for providing biometric identification of the user. The interface card includes a pair of separate sensors 45, 54. (Col. 8, line 53 through Col. 9, line 24; and Figure 11, reproduced below). The primary sensor includes a capacitive fingerprint sensor including an array of individual pixels for sensing the ridges and valleys of a user's fingerprint based upon capacitance differences on the user's finger. (Col. 9, lines 55-61). The secondary sensor is for sensing light. (Col. 9, lines 42-45).

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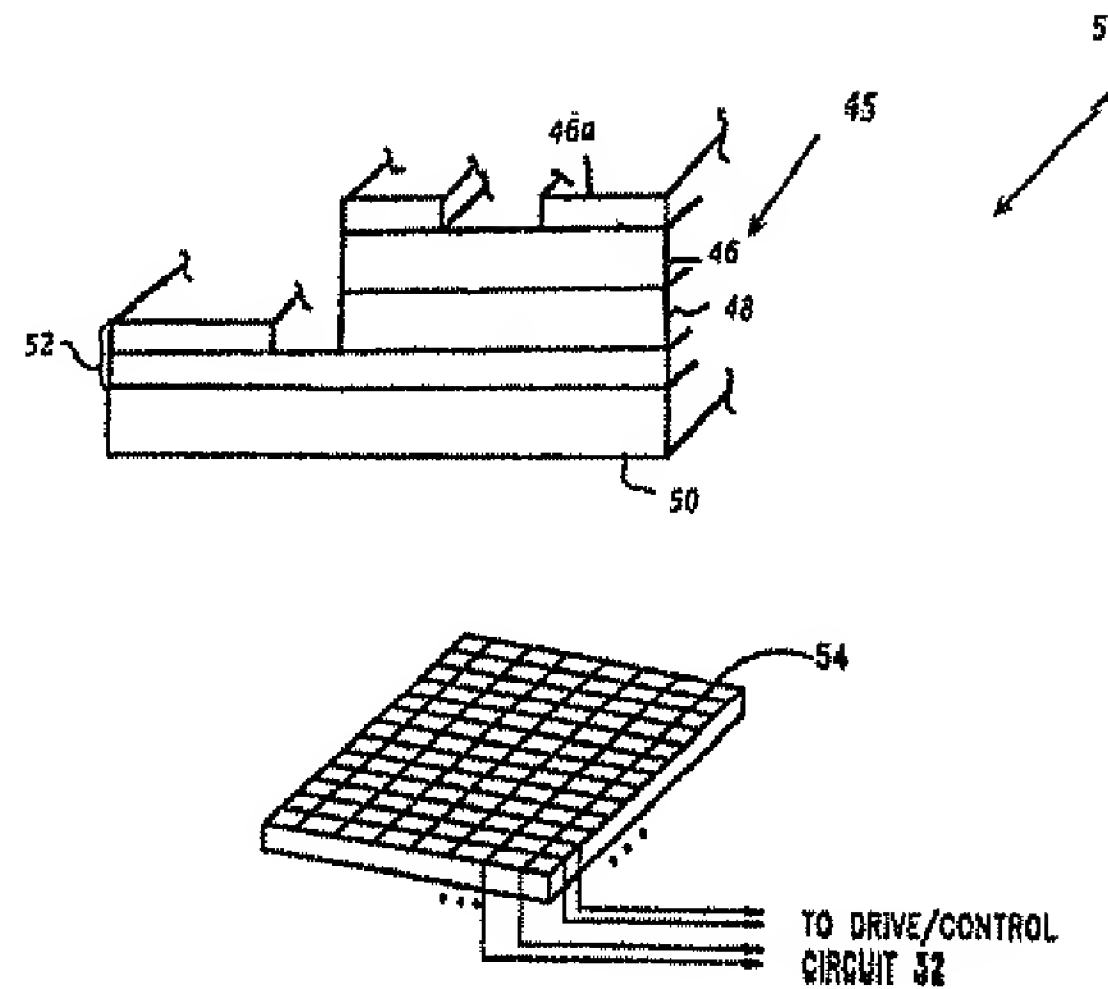


Figure 11 of Dickinson et al.

For the structure of the sensor, Dickinson et al. incorporates by reference U.S. Patent No. 6,856,383 to Vachris et al. and U.S. Patent No. 6,501,846 to Dickinson et al., both of which disclose devices for imaging a relief object, for example, a fingerprint, using electroluminescent sensors. The Examiner's stated motivation to combine the light sensing disclosure of Smisko and Zhang with the fingerprint sensing disclosure of Dickinson et al. is to provide a "capacitor that senses pressure as well as light" and to provide a multifunctional device. (Official Action of 4-3-2009 at Page 5).

Applicants submit that the Examiner's 3-way combination of the prior art references fails to disclose each feature of the claimed invention. More particularly, Dickinson et al. fails to disclose generating a voltage of the pressure based capacitance of a selected pressure-sensing capacitor of the array, as recited by independent Claim 8, for example.

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Differently, Dickinson et al. discloses "a capacitive fingerprint sensor that distinguishes valleys and ridges based on differences in effective capacitances between the finger surface and the sensor surface." (Col. 9, lines 57-59). None of the applied references or any of the references incorporated by reference in Dickinson et al. discloses this feature of the independent claims.

Moreover, Applicants submit that the Examiner's proposed combination is improper and that the Examiner is improperly piecing together pieces of the prior art. Applicants submit that a capacitor that can sense both light and pressure makes little technical sense in light of the primary reference, which discloses a noise reduction method for a photodiode circuit. Indeed, Applicants submit that it appears that the Examiner is simply aggregating disjoint teachings into Smisko in an attempt to produce the claimed invention. Yet more, the broad and cursory motivation to combine the fingerprint sensor of Dickinson et al. has little relation to the primary purpose of Smisko. In fact, for argument's sake, if making a device multi-functional were to hypothetically carry the Examiner's burden of proving obviousness, Applicants submit that extending that logic to its inevitable conclusion would render any invention obvious.

Further, Applicants remind the Examiner that the Supreme Court of the United States has stated that:

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple

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patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. See *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006) ([R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness).
KSR v. Teleflex, No. 04-1350, 550 U.S. 398 (2007) (Emphasis added)

Applicants submit that the Examiner must explain why the person of ordinary skill in the art would provide the secondary fingerprint sensor of Dickinson et al. into the photodiode of Smisko that amounts to more than a desire to be "multi-functional."

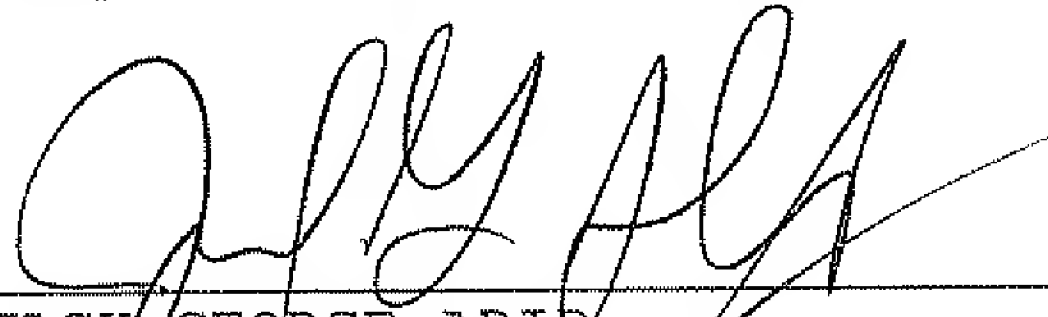
Therefore, for either of the above detailed reasons, Applicants submit that independent Claims 8, 11, 15, 19, and 22 are patentable over the prior art. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

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CONCLUSIONS

In view of the arguments presented above, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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